HUMAN NATURE PROJECT ONTARIO

March 2024 Newsletter

SEASONAL THEME: GLACIAL MELTS

Welcome to the March edition of HNP Ontario's revamped newsletter, where the stories are compelling as ever!

In this month's edition, we have our Nature News Reels diving right into the alarming rise of temperatures but the devastating sinking of species!

We are also plunging into adaptation strategies, aligning with our seasonal theme of glacial melting. Explore innovative ways in which we aim to mitigate the effects of climate change on glacial melts.

Stay informed, engaged and empowered---together, let's make a difference!

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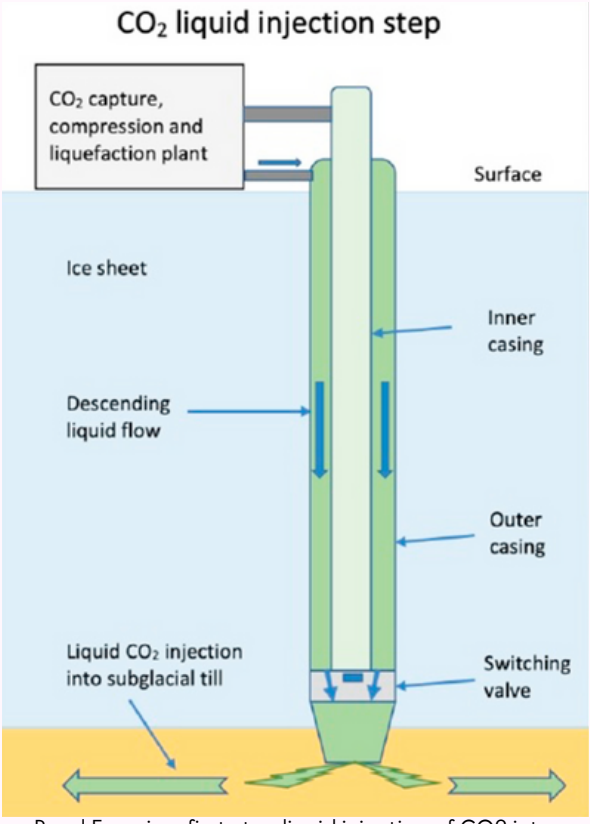
GLACIAL MELTS - HOW CAN WE FIX IT?

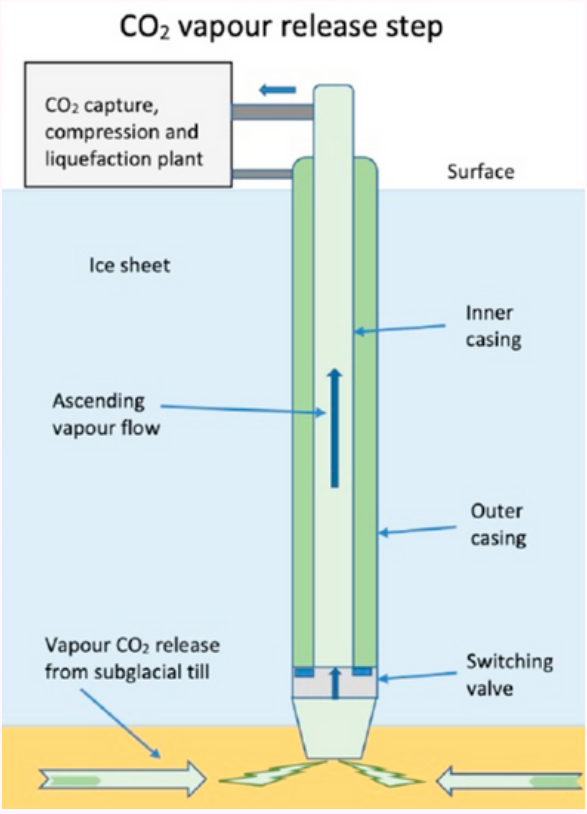
Antarctica and Greenland combined are losing 420 billion tons of ice mass per year, with the "meltwater [being] responsible for about one-third of the global average rise in sea level since 1993" (NASA Global Climate Change, n.d.). It has become imperative to develop innovative adaptation strategies to reduce the impacts of human activities. Although climate change is the persistent driving force chipping away at glacial ice sheets, temporary measures can still be taken to mitigate the effects of global warming. Most notably, glacial engineering techniques, such as underwater structures or refrigeration, can provide immediate payoffs in extending the longevity of the world's glaciers.

Melting Glaciers (Sadura, 2013)

Geoengineering describes the extensive projects, often nationwide, used to combat climate change and its disastrous effects. To combat the rising sea levels requires particularly ambitious and creative solutions. Professors of glaciology, John Moore and Micheal Wolovick, proposed the idea of constructing an ice shelf to prevent the collapse of glaciers, such as the Thwaites ice stream in West Antarctica. An endeavour on this scale would require making modifications to the sea floor, but would ultimately protect the lives of millions. Those who live in coastal areas are at constant risk of flooding, and without human intervention, Wolovick predicts that the melting of the Thwaites glacier could "'raise global sea levels by about 3 metres'" (European Geosciences Union, 2018). Supporting structures do not need to be complex, as the team suggested constructing an underwater wall, which would shield the ice shelf base from warm currents. Even artificial columns were projected to be able to reduce the rate of rising sea levels, allowing glacier ice to reform and act as support.



Basal Freezing, first step liquid injection of CO2 into glaciers to promote cooling (Lockley et al., 2020a)



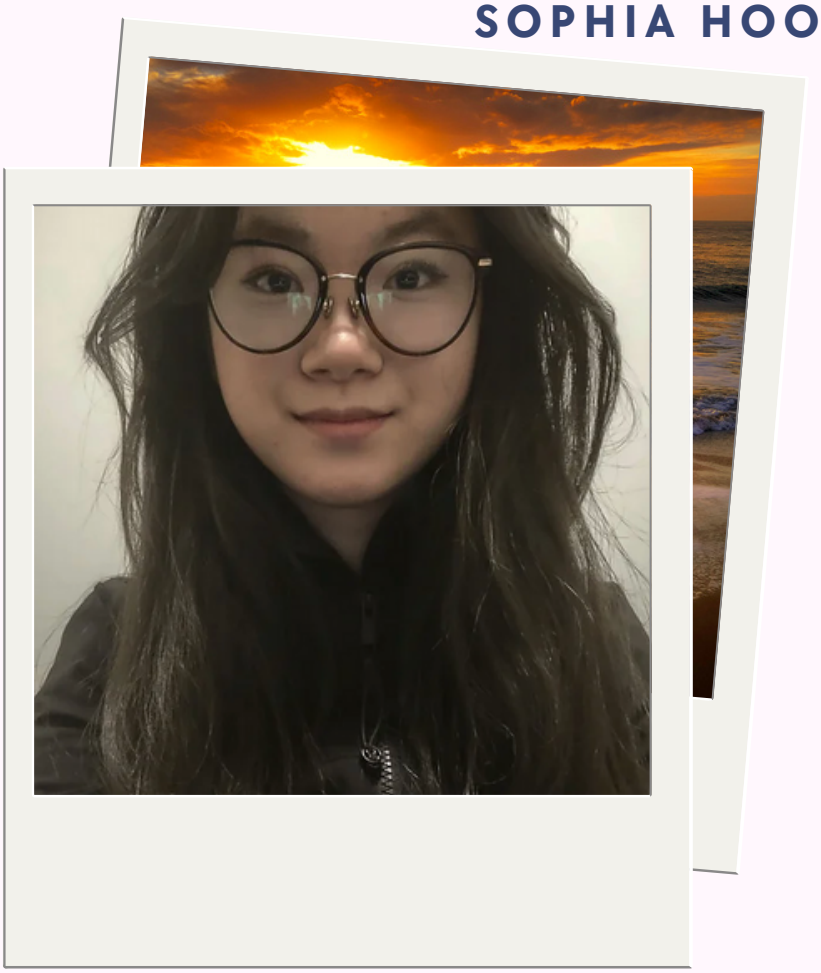
Basal Freezing, second step, release of vaporous CO2 to draw heat away from glacier (Lockley et al., 2020a)

Basal freezing is a strategy proposing the use of coolants to promote freezing throughout all layers of the glaciers. Practical challenges with construction arise, however, with further development, this method has the potential to combat rising greenhouse gas levels as well. Liquid carbon dioxide surpasses other refrigerants due to its relatively low production cost. The sequestration of carbon (drawing atmospheric CO2 to store within a carbon pool), would reduce current levels of greenhouse gases. The coolant would be injected through a pipe drilled into the glacier, and released into the subglacial till, a deposit beneath its bottom layer. A valve then switches to allow trapped CO2 vapours to escape, allowing it to transfer latent heat and reduce thermal energy. Capturing carbon dioxide from the atmosphere is especially efficient in areas of low temperature and humidity, including polar regions. Basal freezing draws from thermosyphons, a pre-existing technology "used for passive winter cooling of foundations in permafrost zones" (Lockley et al., 2020).

Although both underwater walls and basal freezing pipes are strong contenders for mitigation plans, Moore and Wolovick sum up the ultimate goal. Setting policies to control the rapid growth of climate change should be the priority, as temporary measures preventing glacial melting will only hold for so long. Following through with the construction of underwater walls or coolant pipes will simply become unrealistic if global warming continues wreaking havoc on polar ecosystems. The glaciologists stress that their contingency plans are not an excuse for inaction, making it vital for citizens and policy makers alike to step up and protect the ice shelves that have been sustaining humanity for millenia.

Executive of the Month

SOPHIA HOO



1. What do you enjoy most about being on the HNP team?
I enjoy the community we have built amongst the team. I like how our executive team is less serious at times during our weekly general meetings and in person events.

2. Tell us more about the recent task you've been working on.
Within the HR Administration team, we mainly work on logistics regarding our executive team. Recently, we had a big hiring in January, so we have been conducting one on one check-in meetings with the new hires. This is just to make sure they are suited and staying on track with everything.

Executive of the Month

Congrats!

3. Tell us more about the significant role you play in being a part of the executive team.
I am an HR Administration Director. Basically, my team takes care of management regarding the HNP executive team. This involves resignations, strikes, check-ins, attendance, etc. Additionally, we team up with the HR recruitment team to conduct hirings or target hirings.

4. What is something you learned while being a part of the HNP team?
Throughout my time at HNP, I learned how to be a team player. Being that I started off as an associate and now am a director, I have experienced both sides of the team structure. I have understood that in order for a team to run, everyone has to pull their weight and good communication needs to be involved.

5. What is your most memorable experience with HNP?
My most memorable experience at HNP is the recent January hiring HR did. It was my first time organizing such a big task and conducting a large number of interviews. I got to meet many high school students through face to face interviews, and learn about their passions or goals.

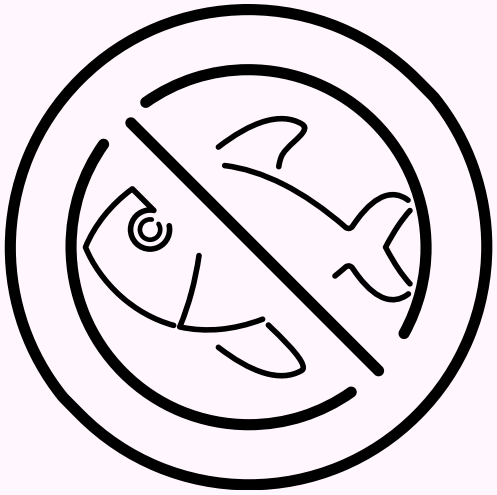
6. How does it feel to be a member of the HNP team?
It feels rewarding to be a member of HNP Ontario. I stand by our team's objective and know that we are helping to limit climate change even if it is on a small scale.

NATURE NEWS REEL

RISING TEMPS & SINKING SPECIES

As temperatures continue to rise, ecosystems are at great risk. Global warming affects the physiology of individual organisms as well as an entire community structure and food web, on a larger scale (Gauzens et al., 2024).

In order to overcome this issue, scientists use Allometric Trophic Network (ATNs). ATNs bridge the gap by incorporating individual level biological processes into ecosystem-level predictions. Through looking at factors such as body size and temperature, ATNs provide insights on how global warming affects species biomass and biodiversity ("German Centre for Integrative Biodiversity Research," 2024).



As temperatures rise, organisms change the way in which they hunt/gather food. Traditional models only looked at how temperatures affected the organisms physiology, instead of examining behavioural changes (Gauzens et al., 2024).

Data from fish stomachs reveal a crucial insight: as temperatures rise, fish are eating more but not necessarily smarter. They're foraging the food sources that are abundant, but not the energy-packed meals that could sustain them in the long run. This mismatch between what they need and what they are foraging, especially for fish higher up in the food chain can ultimately lead to decline of these species and in worst case scenario, extinction. The flexible feeding habits observed in fish under rising temperatures may make these species more vulnerable to climate change effects. Initially although this adaptive behaviour seems beneficial, it is quite harmful in the long run ("German Centre for Integrative Biodiversity Research," 2024).

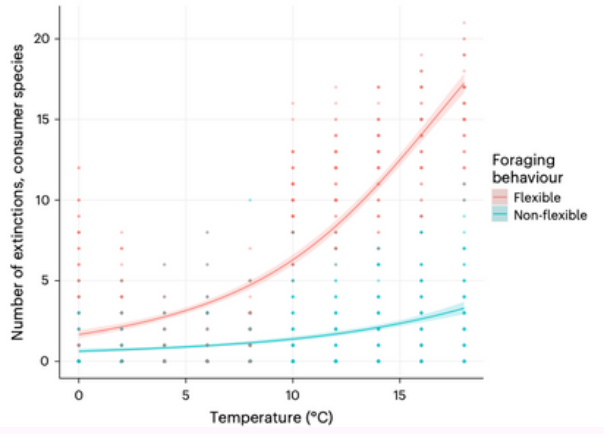


Figure 1. The blue line predicts the average extinctions without considering species' response to local conditions. The red line predicts average extinctions with consideration of species' response to local conditions. As species become more flexible in their foraging behaviours, extinctions increase due to them not acquiring the right food sources for their optimal survival.

HUMAN NATURE PROJECTS ONTARIO

EARTH DAY COMPETITION 2024

"CHALLENGE, CHANGE, INSPIRE."

COMPETITION RUNNING FROM APRIL 22ND-26TH!

Human Nature Projects (HNP) Ontario is a federally incorporated, youth-led, non-profit organization seeking to raise awareness for current environmental issues in order to prompt more sustainable development and drive environmental change in the community.

PERKS OF PARTICIPATING

- Promote and effect positive environmental change within your school community!
- Earn up to 30 volunteer hours and a certificate of recognition from HNP Ontario.
- Win up to $300 in prizes and help HNP Ontario recognize environmentalists in your school!
- Be featured on HNP Ontario's website and get a chance to participate in a podcast episode!

Environmental committees, councils, clubs and student leaders are encouraged to register their high schools to compete in one of three streams:

COMMUNITY CLEANUP

Organize a student-led cleanup within your school and the surrounding community.

CO_2 REDUCTION CHALLENGE

Engage the student body to collectively reduce your school's carbon emissions.

PLEDGE TO GO GREEN

Encourage the student body to pledge and make your school more environmentally friendly.

Register your highschool to compete with other secondary schools in Ontario using this QR code by **Wednesday, April 3rd, at 11:59 pm EST.**

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